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THE COUNCIL FOR TOBACCO RESEARCH—U.S.A., INC.
110 EAST 59TH STREET
NEW YORK, N. Y. 10022
(212) 421-8885

RECEIVED
MAY 3 - 1974

Application for Research Grant
(Use extra pages as needed)

Date: April 30, 1974

1. Principal Investigator (give title and degrees):
Norman W. Heimstra, Ph.D. Professor and Director, Human Factors Laboratory

2. Institution & address:
University of South Dakota, Vermillion, S.D. 57069

3. Department(s) where research will be done or collaboration provided:
Department of Psychology

4. Short title of study:
Effects of Smoking Deprivation on Risk-Taking Behavior

5. Proposed starting date: Sept. 1, 1974

6. Estimated time to complete: One year

7. Brief description of specific research aims:
To determine whether enforced deprivation from smoking will modify risk-taking behavior.

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8. Brief statement of working hypothesis:

Smoking deprivation has been shown to modify various affective states of individuals. It is likely that certain aspects of behavior may be associated with these changes in affective state and that smoking deprivation may thus influence these kinds of behavior. It would seem that risk-taking behavior would be particularly susceptible to modification by the stress and changes in affective states brought about by smoking deprivation. The proposed investigation is designed to determine whether this is the case.

9. Details of experimental design and procedures (append extra pages as necessary)

See attached proposal

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10. Space and facilities available (when elsewhere than item 2 indicates, state location):

Space in the Human Factors Laboratory will be available for this study. The test equipment needed to conduct the investigation has been used in a series of previous investigations and is functional. No additional equipment will be needed. Computer facilities in the laboratory are available for data analysis.

11. Additional facilities required:

None

12. Biographical sketches of investigator(s) and other professional personnel (append):

See attached vita

13. Publications: (five most recent and pertinent of investigator(s); append list, and provide reprints if available).

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Pertinent Publications*

(with C. R. Scoughton) The effects of smoking on peripheral movement detection. Final Report, April 1974, U.S. Army Research and Development Command, Washington, D.C. 20314

The effects of smoking on mood change. In W. L. Dunn (Ed) Smoking Behavior: Motives and incentives. Washington, D.C.: V. H. Winston & Sons, 1973.

(with R. L. Lucas and D. K. Spiegel) Part-task simulation training of driver's passing judgments. Human Factors, 1973, 15, 269-274.

(with N. R. Bancroft and A. R. DeKock) Effects of smoking upon sustained performance in a simulated driving task. In H. B. Murphy (Ed) The effects of smoking on the central nervous system. Ann. N. Y. Acad. Sci., 1967.

(with R. A. Krippner) Effects of smoking on peripheral visual acuity. Technical Report, Human Factors Laboratory, University of South Dakota, 1969.

*Additional relevant studies conducted in my laboratory by members of my staff are listed in the Reference section of the proposal.

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14. First year budget:

	% time	Amount
A. Salaries (give names or state "to be recruited")		
Professional (give % time of investigator(s) even if no salary requested)		
Norman W. Heimstra, Ph.D. Principal Investigator		REDACTED
Research assistant (M.A. level graduate student - to be recruited)		REDACTED
Technical		
Hourly assistance 300 hrs. at $2.50/hr.		R
Fringe benefits for above		R
		R
Sub-Total for A		—
B. Consumable supplies (by major categories)		
Maintenance on equipment		$300
Consumable items (paper, questionnaires, etc.)		200
Sub-Total for B		500
C. Other expenses (itemize)		
Payment for subjects (30 at $25 each)		750
Sub-Total for C		750
Running Total of A + B + C		$ 9328
D. Permanent equipment (itemize):		
None		
Sub-Total for D		0
E. Indirect costs (15% of A+B+C)		$ 1399
Total request		$10727

15. Estimated future requirements:

	Salaries	Consumable Suppl.	Other Expenses	Permanent Equip.	Indirect Costs	Total
Year 2	None					
Year 3						

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5.

16. Other sources of financial support:
List financial support from all sources, including own institution, for this and related research projects.

CURRENTLY ACTIVE

Title of Project	Source (give grant numbers)	Amount	Inclusive Dates
Effects of smoking on peripheral movement detection (Year 2)	U.S. Army Medical R&D DADA17-73-7-3037	17,121	11/01/74 - 10/30/75
Deprivation on Group Problem Solving Processes (Year 1)	Council for Tobacco Research #898	12,592	10/01/74 - 9/30/75
Accident Prevention Research (Final year - project to be concluded)	USPHS OH 00002-08	213,500	7/01/69 - 5/30/75

PENDING OR PLANNED

Title of Project	Source (give grant numbers)	Amount	Inclusive Dates
Task Factors Influencing Motivation of Workers	USPHS	28,000	1/01/75 - 12/31/77
Sex differences in response to information overload	Dept. of Army	21,000	1/01/75 - 12/31/75

It is understood that the investigator and institutional officers in applying for a grant have read and accept the Council's "Statement of Policy Containing Conditions and Terms Under Which Project Grants Are Made."

Principal investigator

Typed Name Norman W. Heimstra, Ph.D.

Signature Norman Heimstra Date 4/22/74

Telephone 605-677-5295 (Area Code / Number / Extension)

Checks payable to

University of South Dakota

Mailing address for checks

Business Manager, Univ. of S.D.

Vermillion, S.D. 57069

Responsible officer of institution

Typed Name Richard L. Bowen, Ph.D.

Title President

Signature [signature] Date 4/30/74

Telephone 605-677-5641 (Area Code / Number / Extension)

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INTRODUCTION

Studies concerned with smoking and behavior have typically focused on variables which are considered to be important in determining whether or not a person begins to smoke and other factors that are assumed to be of importance in the maintenance of this type of behavior. Other investigations have dealt with the effects of smoking on certain specific aspects of behavior such as motor skill, learning ability, and so forth. Considerable interest has also been shown in developing techniques aimed at modifying or eliminating smoking behavior. Another area of interest, however, where relatively little research has been conducted deals with the effects on behavior of enforced or voluntary cessation of smoking. The fact that legislative action has resulted in numerous situations where enforced smoking deprivation occurs and that large numbers of individuals attempt to stop smoking on a voluntary basis would indicate that this is an important area of research.

Research in our laboratory has been concerned with this problem for several years. For example, in an early study (Heimstra, Bancroft and DeKock, 1967) which involved subjects operating a driving simulator for a number of hours, smokers who were not allowed to smoke during the time they operated the device performed poorly in contrast to smokers and subjects who were non-smokers. In a series of other investigations, reported in Smoking Behavior: Motives and Incentives (Heimstra, 1973) smoking has been shown to reduce fluctuations in mood states during the performance of stressful tasks while smoking deprivation resulted in increased mood fluctuation. Currently, a study is underway in our laboratory which deals with the effects of smoking and smoking deprivation on group problem solving and social interactions.

While there are some data available, then, from this laboratory and others concerning the effects of smoking deprivation on behavior, there are many types of behavior that have not been studied which may be affected under conditions where smokers are, for various reasons, deprived of smoking. One type of behavior, which we feel may be particularly susceptible to deprivation effects, is that which has been labeled "risk-taking" behavior. Because risk-taking behavior may be determined to some extent by prevailing affective states and, since research has shown that these states are modified under conditions of smoking deprivation, it seems quite likely that risk-taking behavior may also be affected by smoking deprivation.

Risk-taking and decision making behavior has been the subject of a large amount of research but the emphasis has been on the development of subjective probability models and abstract decision theory (Coombs, Dawes, Teversky, 1970; Edwards and Tversky, 1967; Edwards, 1968; Kogan and Wallach, 1964). Actually, very little research has been conducted where this type of behavior was studied in "real-world" settings or even in simulated real-world settings. In our laboratory, as part of the ongoing

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research program concerned with driver behavior, we have developed a methodology for studying risk-taking behavior in a laboratory setting where certain aspects of the driving task are simulated. While these tasks are described in detail in the METHODS section of this proposal, a brief overview of the type of research that has been conducted with these tasks will be given at this point.

Both of the tasks can be considered as laboratory analogs of the automobile passing task. One of the tasks was initially developed (DeKock, 1968) to study the relationship between decision making under conditions of risk and selected psychological tests while the other task was designed initially to train drivers on a critical passing skill (Lucas, Heimstra, and Spiegel, 1973). These tasks have been used in a variety of studies in the applicant's laboratory. For example, under a contract from Abbott Laboratories (Ellingstad, Struckman and Sebring, 1972) the effects of a new drug (Abboutt 35616 - Tranxene) on performance on these tasks was determined. In another study, funded by the Department of Transportation (Ellingstad, McFarling and Struckman, 1973), the effects of marijuana and alcohol on performance on these tasks was investigated. Recently, a study has been completed which compared performance on the laboratory passing task while subjects were intoxicated with performance in an actual vehicle with the same subjects again intoxicated (Stone and Ellingstad, 1974). Several other unpublished exploratory studies have also been conducted with these tasks. In general, then, these tasks have been shown to be sensitive to several types of independent variables and to different levels of these variables.

The objective of the proposed investigation is to determine whether "risk-taking" behavior, as measured by these tasks, will be modified when smokers perform on these tasks after a period of smoking deprivation.

METHODS

Subjects:

Subjects will be 30 male volunteers from the University of South Dakota student population. All will be solicited from the "pool" of Ss obtained at the beginning of each semester on the basis of questionnaires administered to students in several large classes dealing with their smoking habits. All Ss will be "smokers" i.e., individuals who smoke at least 20 cigarettes a day and have done so for at least six months. All potential Ss are screened for visual defects prior to being accepted for the study. Ss are paid to participate.

The 30 Ss will be randomly assigned to two groups of 15 Ss each. One group will be tested under a "smoking deprived" condition and the other group under a "smoking" condition.

Task and Apparatus:

Film Passing Task: The Film Passing Task apparatus consists of two sequences of 16mm color film presented on a rear projection screen to a subject seated in a mock-up of an automobile cockpit in an adjoining room. Figure 1 depicts the physical

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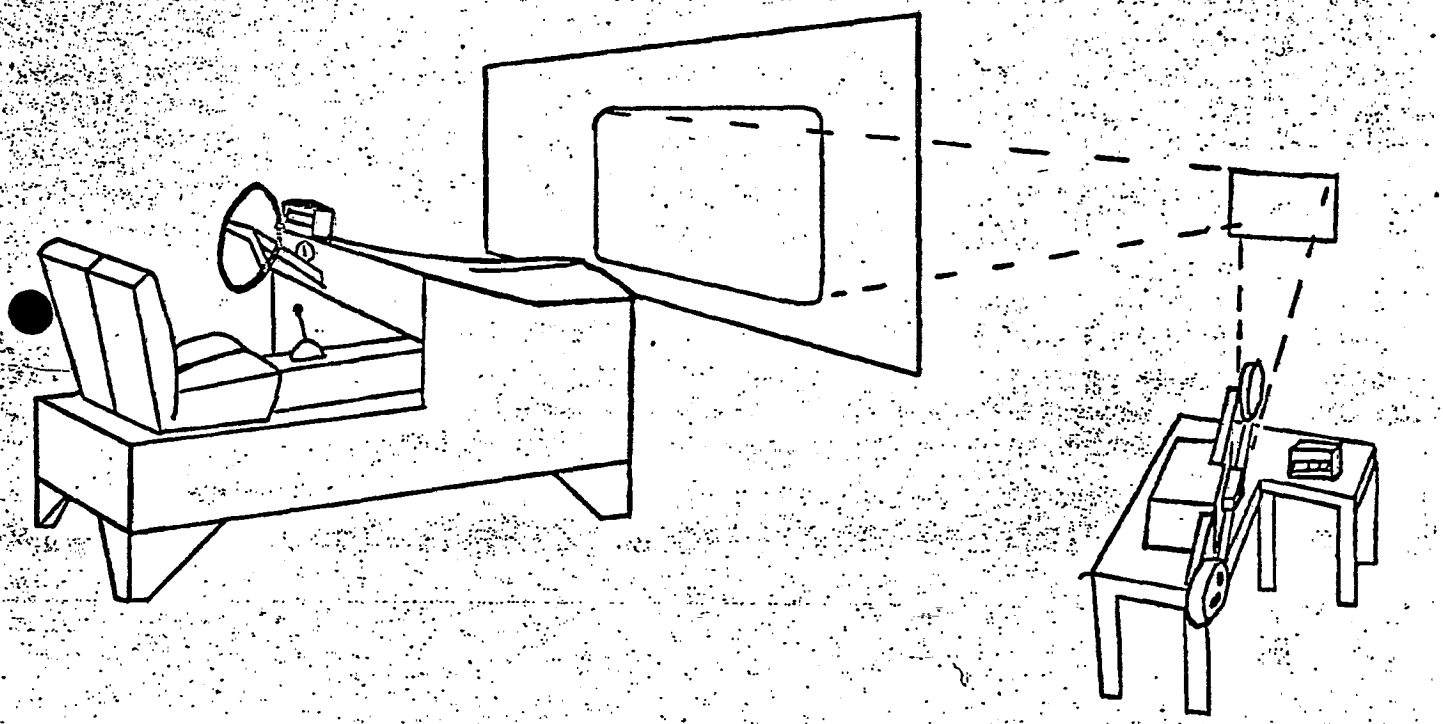

Figure 1

Film Passing Task Projection System

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setup of this task apparatus.

The first of the film sequences, the passing film, was taken from the driver's position in a vehicle following a "lead car" maintaining a constant speed of 60 miles per hour on a four-lane divided highway. The car following the lead car will henceforth be referred to as the "passing car." The passing film was divided into 47 scenes in which the passing car would begin behind the lead car, overtake the lead car, and return to the right lane of travel. The passes were accomplished in a manner such that each pass was completed in the shortest time possible. An effort was made to maintain a consistent passing time between scenes. The second of the sequences, the oncoming film, was filmed on two-lane highways with the passing car remaining behind the lead car throughout the duration of the film. Naturally occuring traffic served as oncoming vehicles in the respective scenes. Each scene begins with the passing vehicle following the lead car on the highway. Shortly after the scene begins, a vehicle in the oncoming lane appears at a distance that allows the subject sufficient time to notice the oncoming vehicle. The scene proceeds with the oncoming vehicle gradually approaching the lead car, coming abreast of the lead car, and passing on. Thirty-five of these scenes comprise the oncoming sequence of the film passing task.

The sound track of the oncoming film is modified in order to provide a consistent automatic timing system for computing the subject's errors. For each of the 35 scenes in the oncoming film, a small hole has been drilled in the sound track opposite the frame which represents the last possible safe moment to pass for that particular scene. The placement of this hole was determined by computing the mean time required to pass by the passing vehicle in the production of the passing film. Time required to pass for each scene is defined as the time elapsed from that point when the left wheels of the passing vehicle crossed into what would be the opposing lane of traffic on a two-lane highway to the time when the left wheels of the passing vehicle entered the proper traffic lane after accelerating around the lead car, thus completing the pass. The mean time required to pass was then multiplied by the film speed in frames per second, to determine the number of frames in advance of the frame in which the oncoming car came abreast of the lead car, thereby locating the placement of the hole and defining the last safe moment to pass for that particular scene.

The Film Passing Task utilizes the first sequence, or the passing film sequence, to familiarize the subject with the capabilities of the passing vehicle. The subject views the passing film to obtain an idea of how quickly the lead car could be passed by the passing vehicle. The oncoming sequence of the Film Passing Task is used to establish the measures of risk-taking used in the investigation. After viewing the passing film sequence of the task, the subject is instructed to indicate the last possible moment he could begin and successfully complete a pass of the lead car without colliding with the oncoming vehicle in the oncoming film scenes. The subject's

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decision is based on the information he had received from the passing film sequence. The subject indicates his decision as to the last safe moment to pass by pressing a hand-held response switch. Provision is made for feedback to the subject via a digital readout display. The display provides the subject with information as to the magnitude and direction of his errors. Direction of the error is defined as either early or late. An early response indicates the subject had decided to pass at a point in time such that, had he actually initiated the pass, he would have been able to successfully complete the pass with time to spare. A late response, on the other hand, indicates that the subject had responded in such a manner that he could not have successfully completed the pass; rather, his decision to pass would have resulted in forced evasive action or possible collision. The magnitude of the error is presented in seconds early or late (indicated by plus and minus signs, respectively) to the nearest hundredth of a second. This information is also presented to the experimenter on a separate digital display.

Performance Measures - Film Passing Task: As indicated, a Ss score for each scene in the oncoming film consisted of a direction (early or late) and a magnitude in seconds. These scores are broken down to derive the following performance measures.

Mean constant error of estimate: This measure represents the simple mean of the algebraic sum of the S's errors of estimate. The measure reflects both direction and magnitude of the S's errors. It is indicative of the subject's average magnitude of error, without regard to direction.

Root mean square error or estimate: This is a measure of the subject's variability about his own mean error of estimate. It reflects a subject's consistency of error, with respect both to direction and magnitude.

Ratio of late responses to total trials: This measure is indicative of the subject's tendency for late error estimates.

Passing/Decision Task: The Passing/Decision Task apparatus consists of two sets of two clocks each, a clear incandescent light bulb, one yellow indicator lamp, one red indicator lamp, and the subject's response switches Figure 2 is a schematic diagram of the display. Each set of clocks contains one three-hand Standard Electric Timer and one digital readout elapsed-time clock. The Standard Timers are incorporated to elicit a sense of motion or the active passage of time. The digital clocks are used by the subject to obtain an indication of the time elapsed in the task, and his accumulated progress. The subject's task is to keep to a minimum the elapsed time difference between the two digital clocks. One set of clocks represents "real time" or the ordinary passage of time. These clocks run throughout the duration of the task.

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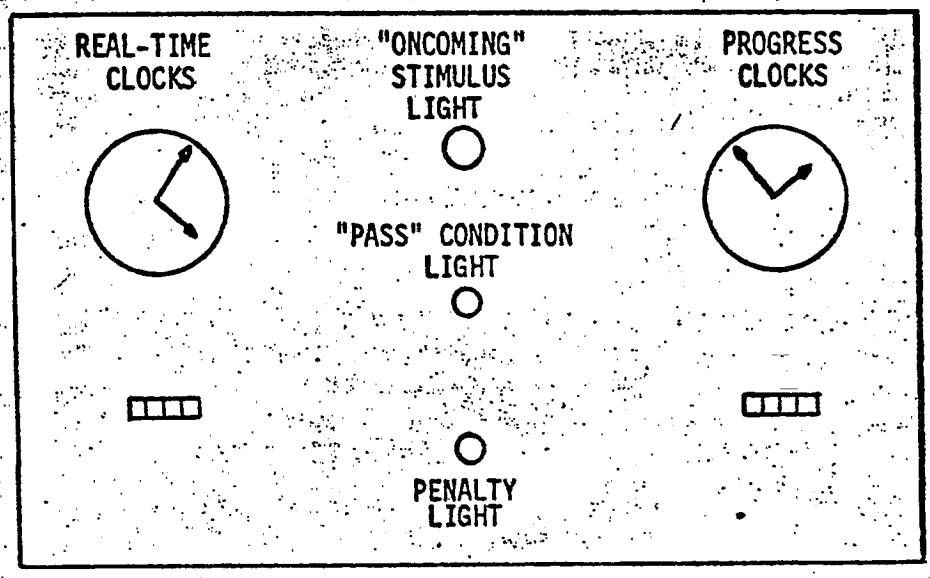

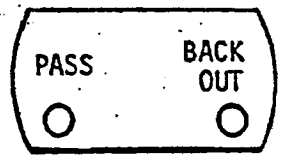

SUBJECT'S RESPONSE SWITCHES

Figure 2

Passing/Decision Task Apparatus Schematic

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The other set of clocks represent the progress of the subject's vehicle on a hypothetical journey. When the subject's "progress clocks" are running, the subject's vehicle is proceeding on the journey unimpeded. When the clocks stop, the subject's vehicular progress is said to have been impeded by a slow-moving vehicle in his lane of traffic. Once the subject's progress clocks stops the clear light comes on at some initial intensity, continues to get brighter until it reaches a fixed intensity, and extinguishes. This clear light represents an oncoming vehicle. The greater the intensity of the clear light, the closer the oncoming vehicle is considered to have been to the subject's vehicle. The initial intensity of the clear light varies for each trial, thus representing different distances from the subject's vehicle, or different amounts of time in which to complete a pass (8, 9, 10, 11 and 12 seconds). Once the clear light comes on, the subject has two options. The first option entails waiting until the clear light reaches its terminal intensity and extinguishes, at which time the progress clocks restart. The subject's second option is to initiate a "pass" by pressing his pass response switch. This action restarts the subject's progress clocks, as well as illuminating the yellow light, signifying that he is in the pass condition. Once the subject elects to pass, a fixed time of 10 seconds is required to complete the pass. Considering the different times of 8, 9, 10, 11 and 12 seconds specifying the pass conditions, and the fixed time of 10 seconds required to complete a pass, it becomes evident to the subject that some trials allow him to safely initiate and complete a pass, while other trials do not allow enough time to complete a safe pass. The actual time required to complete a pass or the times in the different passing trials are never explicitly mentioned to the subjects, however. Thus, if the fixed time required to pass elapsed before the clear light was extinguished, the yellow light will go out and his progress clocks will continue to run, indicating to the subject that his pass attempt has been successful. If the clear light reached its final fixed intensity and extinguishes before the time required to pass has elapsed, the progress clocks will stop and the red light will come on, indicating to the subject that his attempted pass has been unsuccessful, or that he has incurred a collision. Upon the occurence of a collision, the subject's progress clocks remain stopped for a period of 30 seconds as a collision penalty.

Once the subject has opted to pass, however, he can reverse his decision if, in his judgment, the pass cannot be successfully completed. If the subject does decide to reverse his decision, he responds by pushing his "back out" response button. This action stops the progress clocks, and turns off the yellow passing indicator light. An additional cost factor is built into the back-out decision, however, in that once the subject decides to reverse his decision or "back out", he will remain in the back-out condition for a period of time equal to the time that had elapsed in the pass condition. Thus it is

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possible for a collision to occur even though the subject had elected to reverse his initial decision to pass and subsequently backed out. Each passing condition is presented in six trials, in a random order, for a total of 30 trials per task session. A flowchart of subject and apparatus logic decisions appears in Figure 3.

Performance Measures-Passing/Decision Task: In this task Ss make at least one decision and possibly two decisions per trial. The cumulative results of these decisions, in addition to the time factor involved for the initial decision of each trial, are interpreted in terms of the following seven measures:

Total number of safe passes: This measure reports the number of successful decisions to attempt a complete pass on the part of the subject.

Total number of safe backouts: This is a measure of the subject's number of successful decision reversals, once he had elected to pass during a trial and then, due to perceived or actual misjudgment or as a result of initial hesitancy, decided to abort the attempted pass.

Total number of pass "collisions": This is a cumulative measure of unsuccessful attempts to complete a pass.

Total number of backout collisions: This is representative of unsuccessful decision reversals, once an attempted pass had been initiated.

Total number of no responses: This measure reports the number of trials in which the subject did not initiate a passing attempt.

Mean decision latency time: This is the average time elapsed before the subject decided to initiate an attempted pass, whether or not the attempt was successful.

Time difference: This is the difference between the elapsed times on the real-time clock and the subject's progress clock. This measure was taken at the end of the task session.

As pointed out previously in the introduction to this proposal, both of the tasks described above have been used in a number of investigations in the applicant's laboratory. They have been found to discriminate between control groups and groups which have been exposed to several types of drugs. The Passing/Decision Task has also been used in the USPHS Injury Control Laboratory in a series of alcohol/driving studies. In general, we feel that both of these tasks "get at" a type of behavior that has been proved to be elusive in the past and which may be a critical type of behavior not only in the driving task but also in many other kinds of situations.

Data Analysis

The principal statistical technique to be utilized in the analysis of data from the proposed investigation will be a multiple discriminant analysis. The multiple discriminant

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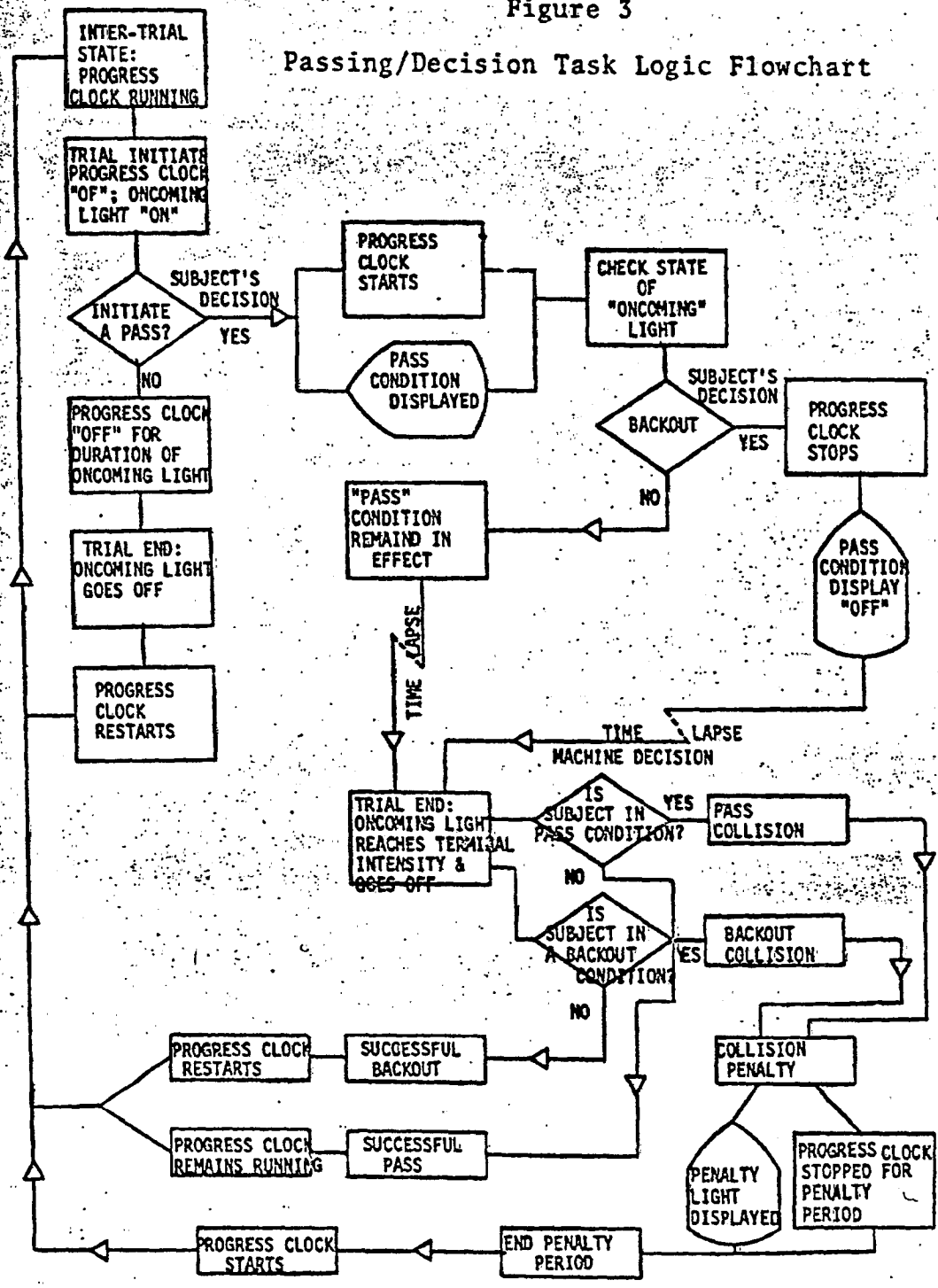
Figure 3

Passing/Decision Task Logic Flowchart



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analysis represents the relatively straightforward extension of the simple one-way univariate analysis of variance to the situation in which multiple dependent variables must be used to characterize the performance of subjects. In the present instance, a total of 11 dependent variables, four from the Film Passing Task and seven from the Passing/Decision Task, will be used to describe the performance of subjects. The multiple discriminant analysis simultaneously evaluates the battery of dependent variables establishing, through the application of the principal components method, a series of sets of discriminant function weights which may be applied to the individual scores on each variable in order to yield a single score which is a linear combination of the 11 dependent variables. A total of n or k-1 (whichever is less) orthogonal linear combinations may be obtained in this analysis, where n equals the number of variables and k equals the number of groups to be deiscriminated. The statistical criterion in the determination of discriminant function weights is to maximize between groups with respect to within-groups variance. Thus the first discriminant dimension(first linear combination of dependent variables) will ordinarily account for the greatest amount of variability and will represent the greatest separation between the groups. Each successive dimension is orthogonal to the remaining dimensions and will ordinarily account for a smaller proportion of total variance.

The interpretation of the results of the multiple discriminate analysis involves an inspection of the set of discriminate function loadings obtained for each separate significant dimension on which between-groups discrimination is possible. The loadings represent the correlation of each variable with the linear combination obtained as a result of the application of the discriminant function weights to the raw data, and as such reflect the importance of each separate variable to the linear composite on the basis of which discrimination was possible.

Procedures

Subjects will report to the laboratory at 9 A.M. (six hours prior to the actual testing). During most of this six hour period, Ss remain in a comfortable waiting room equipped with reclining chairs, TV, magazines, etc. Subjects assigned to the "smoking-deprived" group are not allowed to smoke during this period while Ss assigned to the "smoking" group are allowed to smoke.

Due to the sensitivity and complexity of the two tasks that are utilized, all Ss are given practice sessions on the tasks during the six hour waiting period. The use of practice sessions will serve to familiarize the Ss with the nature of the tasks and will also break up the monotony of the waiting. Practice sessions in the Passing/Decision Task will consist of the reading of detailed and comprehensive instructions to insure the Ss understanding of the task. Upon completion of the instructions the task is presented in the same manner that it will be presented in the actual test session. Practice sessions in the Film Passing

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Task will also consist of instructions and the presentation of the task. Task order will be counterbalanced both between and within subjects in both the practice and actual test sessions.

Instructions and practice will be given between 9A.M. and noon. After the practice sessions, Ss will return to the waiting room and will be furnished with a light lunch. Actual testing will begin at 3 P.M. Testing on both tasks requires slightly over one hour. During the testing, Ss in the deprived group are not allowed to smoke while Ss in the smoking condition are permitted to smoke.

Significance of the Research

Previous research dealing with the effects of smoking deprivation has shown that deprivation may have an effect on certain aspects of performance as well as a modification of the affective state of an individual. Because smoking deprivation, either enforced or voluntary, is a common condition and becoming even more common because of legislative action, it would appear that more data concerning the behavioral effects of deprivation is urgently needed. Anecdotal data, as well as some evidence from studies dealing with mood states and smoking deprivation, suggest that deprivation may induce aggression and other affective states that may have an effect on decision making and risk taking behavior. Data supporting this assumption, however, are lacking. The proposed investigation would determine whether deprivation does, in fact, have an effect on this type of behavior as measured by two test systems which have demonstrated their effectivenss in a variety of studies. It seems to the applicant that it is important to systematically study the effects of smoking deprivation on a variety of types of behavior in order to be able to objectively inform legislative groups and others about possible negative effects of banning smoking in legislative sessions, committee meetings, during operations of various types of equipment, and so forth.

References

Coombs, C. H., Dawes, R. M., & Tversky, A. Mathematical Psychology: An Elementary Introduction. Prentice-Hall, 1970.

DeKock, A. R. Relationship Between Decision Making Under Conditions of Risk and Selected Psychological Tests: Technical Report Number 9. Human Factors Laboratory, Department of Psychology, University of SouthDakota, August, 1968.

Edwards, W. Information processing, decision making, and highway safety. In Driver Behavior: Cause and Effect, Proceedings of the Second Annual Traffic Safety Research Symposium of the Automobile Insurance Industry, Northbrook, Illinois, 1968.

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Source: https://www.industrydocuments.ucsf.edu/docs/yjdm0000

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Heimstra, N. W. The effects of smoking on mood change. In W. L. Dunn (Ed) Smoking Behavior: Motives and incentives. Washington, D.C.: V. H. Winston & Sons, 1973.

Heimstra, N. W., Bancroft, N. R., & DeKock, A.R. Effects of smoking upon sustained performance in a simulated driving task. In H. B. Murphy (Ed) The effects of smoking on the central nervous system. Ann. N. Y. Acad. Sci. 1967.

Kogan, N., Wallach, M. A. Risk Taking: A study in cognition and personality, 1964, Holt, Rinehart & Winston.

Lucas, R. L., Heimstra, N. W., & Spiegel, D.K. Part-task simulation training of driver's passing judgments. Human Factors, 1973, 15, 269-274.

Stone, L. W., & Ellingstad, V. S. Validation of a laboratory procedure for simulating critical interval overtaking. Human Factors (in press)

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VITA

Norman W. Heimstra

I. Biographical Data

Present Address: REDACTED REDACTED

Present Position: Professor
Director, Human Factors Laboratory

II. REDACTED

III. Academic History

B.A. Univ. South Dakota, 1955
M.A. Univ. South Dakota, 1956
Ph.D. Univ. of Rochester, 1960

IV. Related Experience

1. Research Assistant - Univ. South Dakota Primate Laboratory (1955-1956).
2. Teaching Assistant - Univ. of Rochester, 1956-1957.
3. Research Associate - HumRRO (Geo. Wash. Univ.) 1957-1959.
4. U.S.P.H.S. Predoctoral Fellow - Univ. of Rochester, 1959-1960.
5. Research Scientist - HumRRO 1960-1961.
6. U.S.P.H.S. Postdoctoral Fellow, Univ. of South Dakota, 1961-1963.
7. Assistant Prof., Univ. of South Dakota, 1963-1964.
8. Associate Prof., Univ. of South Dakota, 1964-1967.
9. Professor, Univ. of South Dakota, 1967-

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V. Membership in Organizations, Consultantships, Advisory Panels

REDACTED

REDACTED

REDACTED

VI. Academic Experience

Courses Taught--Introductory Psychology
Physiological Psychology (undergraduate)
Seminar in Physiological Psych. (graduate)
Seminar in Psychopharmacology (graduate)
Industrial Psychology (undergraduate)
Personnel Selection & Training (graduate)
Human Factors Psychology (graduate)
Seminar in Accident Prevention Research (graduate)

Ph.D. Dissertations Directed

Arthur McDonald (1966) Modification of agonistic behavior in fish

Truman M. Mast (1966) Influence of motivational variables on prerest and postrest performance in rotary pursuit tracking

Norris Bancroft (1968) Relationship between smoking and psychophysiological response to stress

Mark Hofmann (1968) A comparison of visual, auditory and electrocutaneous displays in a compensatory tracking task

Arlan DeKock (1968) Relationship between decision making under conditions of risk and selected psychological tests

Vernon Ellingstad (1969) A multivariate evaluation of selected driver performance measures

David Damkot (1969) A comparison of auditory, visual, and electrocutaneous displays in a vigilance task

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Gary Martin (1970) Hazard perception by children

Richard Lucas (1970) Development and evaluation of a part task film simulation technique for training drivers on a critical passing skill

Thomas R. Schori (1970) A comparison of visual, auditory, and cutaneous tracking displays when divided attention is required to a cross-adaptive loading task

Harold D. Warner (1970) Effects of intermittent noise on visual search tasks of varying complexity

Kent Kimball (1971) Combined task performance: A study of the effect of coded signal processing on a compensatory tracking task

John Fechter (1972) Effects of noise on skill acquisition

John Feldhaus (1973) The development and evaluation of a job performance appraisal system for clerical personnel

Leslie H. McFarling (1974) An investigation of noise effects, sex differences, and product presentation in simulated inspection

M.A. Theses Directed -- 30

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VII. Publications - Open Press and Technical Reports

1954

(With J. Cho) Perception of absolute size in a distorted room. Proc. S. Dak. Acad. Sci., 1954, 33, 44-47.

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(With S. J. Goffard, R. S. Beecroft, and J. W. Openshaw) Basic electronics for minimally qualified men: An experimental evaluation of a method of presentation. HumRRO Tech. Report #61, 1960.

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Social influence on the response to drugs: I. Amphetamine sulfate. J. Psychol., 1962, 53, 233-244.

Effects of amphetamine sulfate on the behavior of paired rats in a competitive situation. Psychol. Rec., 1962, 12, 25-34.

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(With N. B. Louis and A. Young) Survey of operational rotary wing aviators flying activities. HumRRO Tech. Rep. #75, 1962.

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Social influence on the response to drugs: II. Chlorpromazine and ironiazid. Psychopharmacologia, 1962, 3, 72-78.

(With A. McDonald) Social influence on the response to drugs: III. Age factors in the response to amphetamine sulfate. Psychopharmacologia, 1962, 3, 212-218.

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(With T. M. Mast) Effects of prior social experience on amphetamine toxicity in mice. Psychol. Rep., 1962, 11, 809-812.

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(With T. M. Mast and L. L. Larrabee) Effects of fatigue on basic processes involved in human operator performance: I. Simple vigilance and target detection. Highway Research Record, 1963, 55, 17-20.

(With T. M. Mast and D. K. Spiegel) The relationship between operator mood and performance in a simulated driving task. Tech. Report No. 2, Human Factors Laboratory, University of South Dakota, 1963.

1964

(With A. L. McDonald) Modification of aggressive behavior of green sunfish with D-Lysergic acid diethylamide. J. Psychol., 1964, 57, 19-23.

(With T. M. Mast and H. F. Jones) The effects of fatigue on performance in a simulated driving task. Tech. Report No. 3, Human Factors Laboratory, University of South Dakota, 1964.

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(With H. F. Jones) An investigation of the relationship between performance on a "speed anticipation" test and driver performance. Tech. Report No. 4, Human Factors Laboratory, Univ. of South Dakota, 1964.

(With T. M. Mast) Effects of fatigue on vigilance. J. Engineering Psych., 1964, 3(3), 73-79.

(With H. F. Jones) Ability of drivers to make critical passing judgments. J. Engineering Psych., 1964, 3(4), 117-122.

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(With A. L. McDonald) Agonistic behavior in several species of fish. Psych. Rep., 1965, 16, 845-850.

(With H. F. Jones) Signal detection as function of location. Tech. Report No. 5, Human Factors Laboratory, Univ. of South Dakota, 1965.

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(With D. K. Damkot and N. G. Benson) The effects of silt turbidity on behavior of juvenile largemouth bass and green sunfish. Tech. Paper, Bureau of Sport Fisheries & Wildlife, 1968.

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(With V. Ellingstad) Estimation of movement as a function of target speed, display distance, and concealment distance. Tech. Rep. No. 7, April, 1968, Human Factors Laboratory, USD.

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(With H. D. Warner) Target-detection performance as a function of noise intensity and task difficulty. Perceptual and Motor Skills, 1973, 36, 439-442.

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(With G. L. Martin) The perception of hazard by children. Journal of Safety Research, 1973, 5(4), 238-246.

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N. W. Heimstra (Ed) Injury Control in Traffic Safety. Springfield, Ill.: Charles C. Thomas, 1970.

N. W. Heimstra & V. S. Ellingstad Human Behavior: A Systems Approach. Monterey, California: Brooks/Cole Publishing Company, April, 1972.

N. W. Heimstra & A. L. McDonald Psychology and Contemporary Problems. Monterey, California: Brooks/Cole Publishing Company, February, 1973.

V. S. Ellingstad & N. W. Heimstra Methods in the Study of Behavior. (In press. Brooks/Cole Publishing Co.)

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VIII. Research Support

Approximately one million dollars since 1963.

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